PUBLICATION. SUCCESSFUL METHODS.
MONTH. SEPTEMBER. 1924. VOL. 6. NO. 9.
General Jadwin.
Captain Chambers USN.

Successful Methods

Construction - Road Making - Engineering - Industrial - Mining

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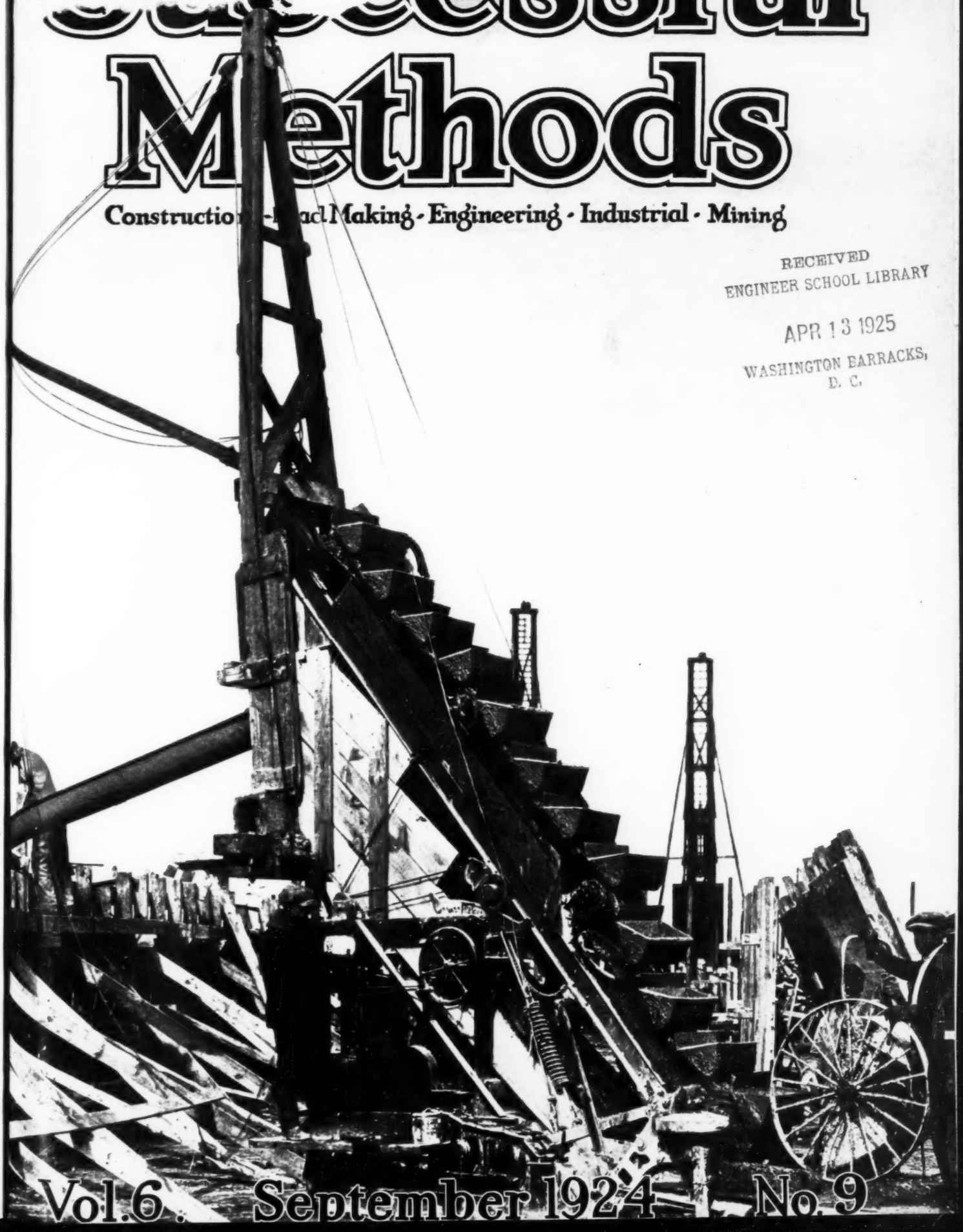

Vol. 6. September 1924 No. 9

LOADS 700 WAGONS A DAY

Loading 700 wagons is just an average day's work for an Austin New Era Elevating Grader. Under ideal conditions, with a tractor for motive power, the New Era will move as high as 1460 yards of earth in 10 hours, which is almost too fast for even a constantly moving stream of wagons, but is desirable when ditches, canals and similar excavations are being made. In this kind of work the New Era will throw up a furrow of earth 15 miles long, 1 foot wide, and 6 inches deep in a single day. Using a New Era means a saving of anywhere from 40 to 70% over old methods.

Hundreds of miles of high, well graded public roads with broad, deep, open ditches for drainage at each side, built over forty years ago and still in good condition, owe their excellence to the New Era. In building large canals, or reservoirs, ditching, cutting down hills, excavating lakes for parks, building levees and as a wagon loader on enbankment work the New Era has clearly demonstrated that it will place earth in wagons for rapid and easy handling at a lower cost per cubic yard than any other method.

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Successful Methods

A Magazine of Construction Service

Published by SUCCESSFUL METHODS, Inc.
F. A. SMYTHE, President
S. T. HENRY, Vice-President and Treasurer WILLIAM JABINE, Secretary and Editorial Director
141 Centre St., New York City, N. Y.

Vol. 6 SEPTEMBER, 1924 No. 9

The Rebound

BUSINESS conditions are on the mend. There is no boom on yet, but in nearly all lines actual business is better. The outlook also is good, with better than an even chance for a big increase all along the line this fall. In a word, we have turned the corner.

The construction industry felt some of the slump more or less all over the country. It did not suffer, however, anything like as much as other lines. In fact, in many sections of the country there has been no let-down at all in construction work. Lately there has been a notable improvement, with much new work starting and a vast amount in sight for early letting.

After the economists and financial experts have finished giving the reasons for such slumps as we are just leaving behind, we all know they are largely due to our sheep-like thinking. A few get scared and the whole flock bolts without waiting to see whether there is any real danger.

One good illustration of this is the recent experience of the manufacturers of plant and equipment. Business went off with them in the spring just when there should have been a peak of buying. Along in July sales began to pick up. August business with many manufacturers reached almost boom proportions. The spring slump in sales exceeded by far the actual slump in construction activity. The summer pick-up also has exceeded the actual gain in construction activity. The indications are that construction men have their nerve up again and that they will take advantage of the increased activity that is at hand.

Getting Together

COOPERATION is quite as much abused a word now as service was a while ago. The needs and opportunities, however, for working together are almost untouched in most industries. This is especially so in the construction industry. But there always is a danger of trying to make the baby walk before it really has learned to creep. Hence, hard-headed business men usually go slowly in taking part in new plans for getting everybody in their line to work together for some purpose.

In spite of these conditions, the American Construction Council has accomplished some real results in bringing the numerous factors in the building business closer together. It has not attempted to solve any technical problems. Nor has it tried to set up a big organization. It has merely taken up some of the general relations and problems that are of importance to all sides in the building industry in a way that enables each party to understand the point of view of the rest. This has resulted in a traceable improvement in relations. It also has been done in a way that should permit more progress along various lines.

Now the Council plans to expand its activities into field work and particularly the construction of highways and public carriers. The Council has invited a number of the leading representatives of all sides interested in these lines of work to its annual meeting, Oct. 2 and 3. It plans nothing revolutionary, but merely to start a commonsense get-together of those whose interests and problems are so closely intertwined that they can best be handled by closer cooperation than has heretofore been common. Due to the success of the Council in the building line, it deserves the full support of those in the outdoor field in its efforts to help them help themselves.

An Awakening

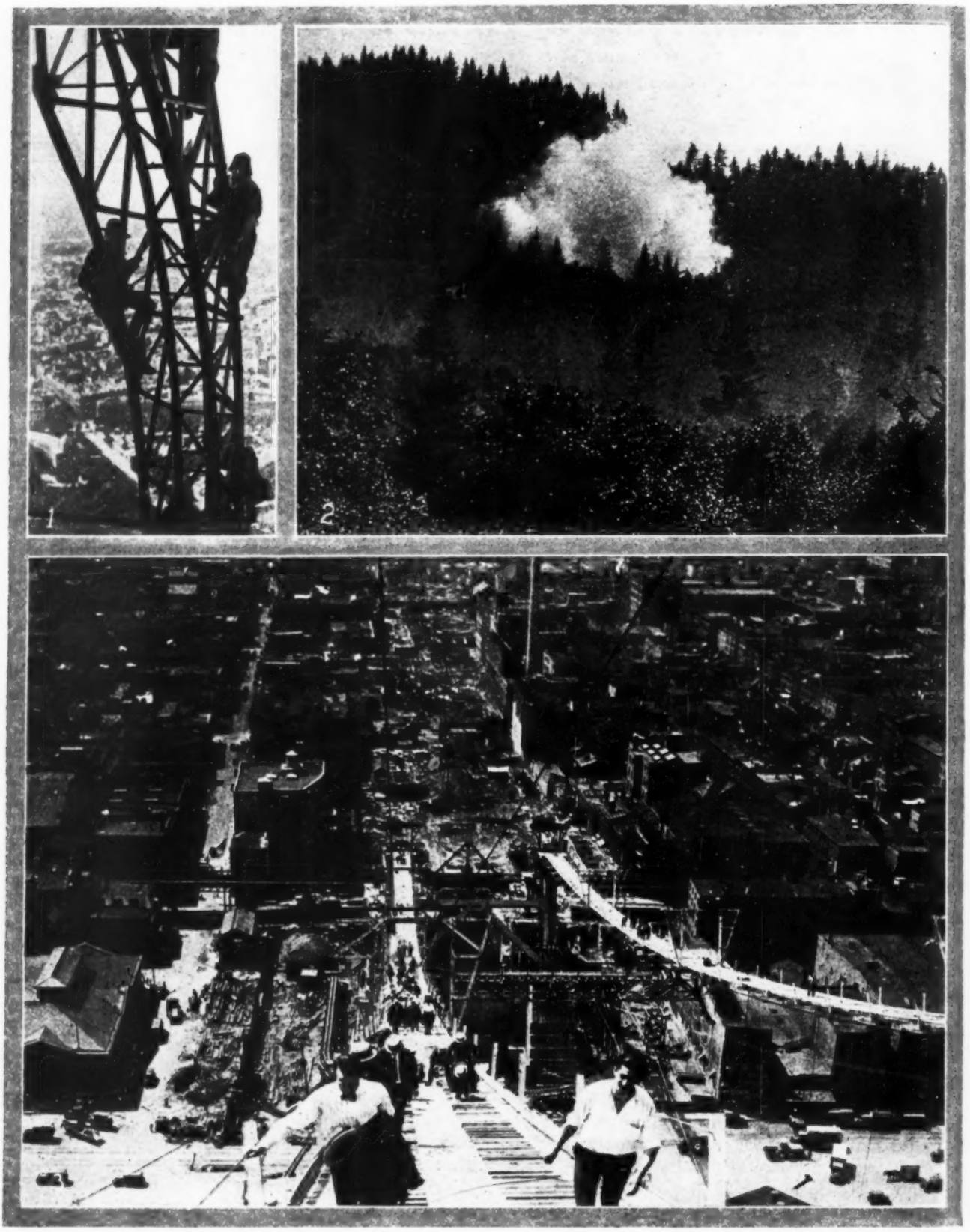
SUCCESS in most lines of heavy construction depends largely on the economical handling of materials. Most men who made good as contractors before the days of "scientific management" were just naturally good handlers of materials, and of men.

Nowadays there are more construction men who study out their jobs from the modern idea of organization. But there is still a surprising number who just simply know by intuition and by experience the best way to plant a job so they can move the materials to best advantage. There also are at least as many who never realize how big a part of their jobs the handling of materials is, and they rarely ever succeed for long.

The construction industry is not alone in this regard. In fact, it seems to be ahead of most other lines in which the moving of materials is a big part of the operations. This is well shown by the work one of the trade papers has done in arousing various lines of manufacturers to the fact that most of their factory costs were in assembling and transporting materials.

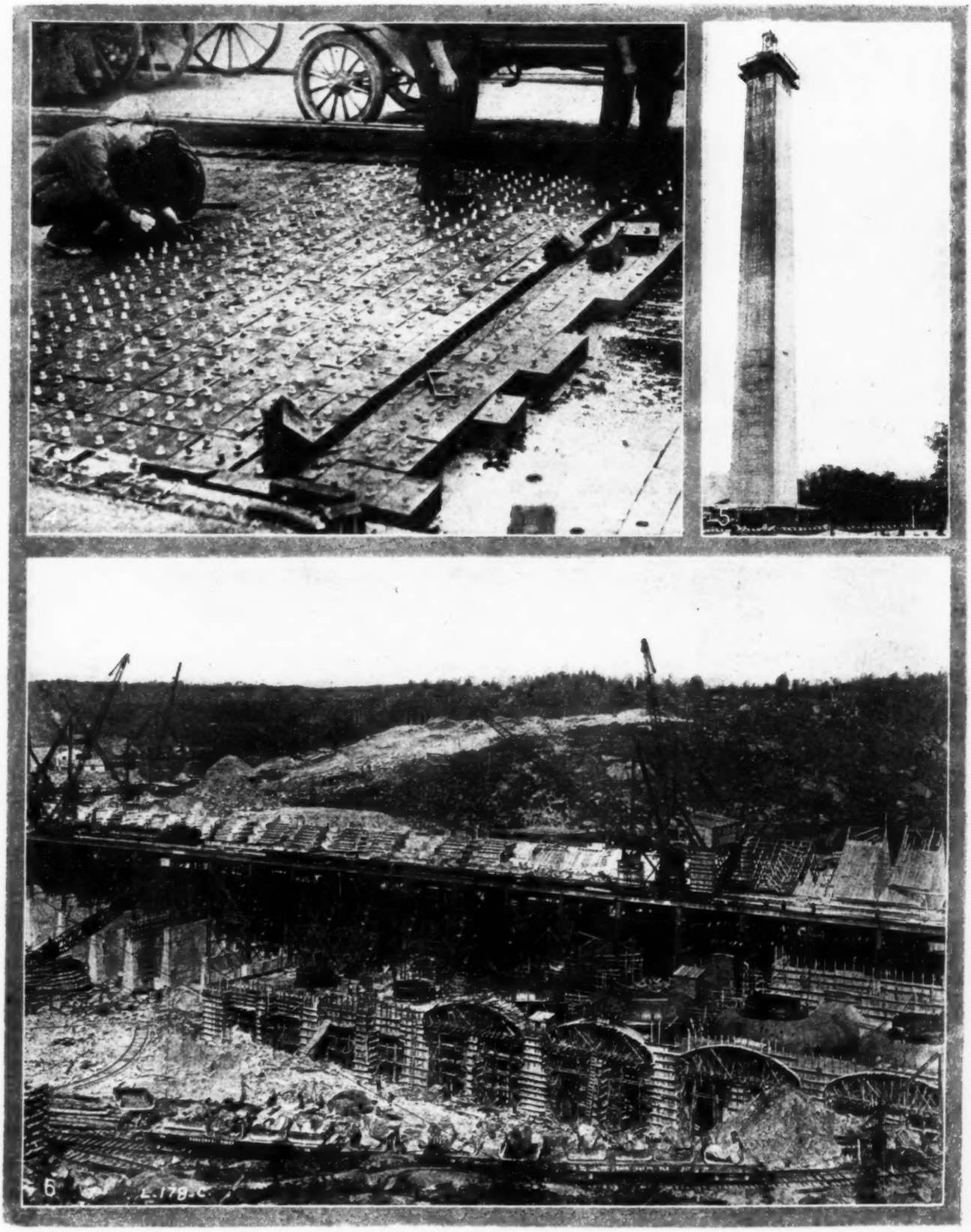
From the studies made in these industries one readily sees that it is hard to overestimate the importance of good methods, good plant and good organization for all material-handling on construction operations.

Some of the High Spots



1. Repainting the Eiffel Tower. Thirty tons of paint were used on this job. © *International*
2. A big blast high up on a California mountainside. © *P & A Photos*
3. The members of the Delaware River Bridge Commission making an inspection trip which took them to the top of the towers. © *Keystone*

In the Construction Field



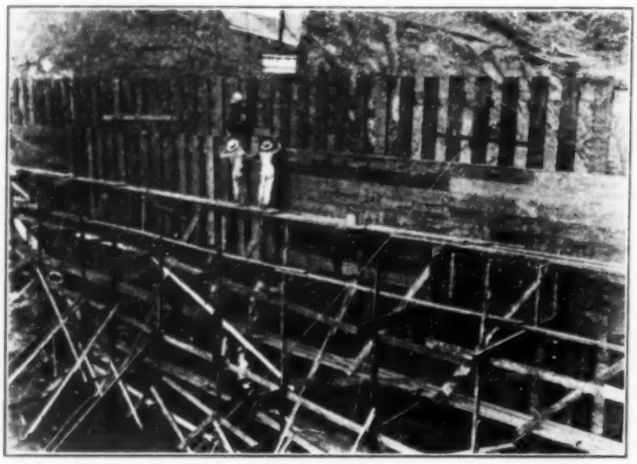
4. London tries out a new kind of pavement on the famous Tower Bridge. © *International*
5. This concrete shaft 351 ft. in height has been built at Fairview, Ky., in memory of Jefferson Davis, President of the Confederacy. © *P & A Photos*
6. A Canadian dam that is being built by the Quebec Development Company at Isle Maligne, P. Q. © *International*

INCREASING WATER SUPPLY IN HAWAII

Construction of Large Earth Dam Will Add 290 Million Gallons to Schofield Barracks Water Supply

By James F. C. Hyde
1st Lieut., Corps of Engineers, U. S. Army, Acting Constructing Quartermaster, Schofield Barracks

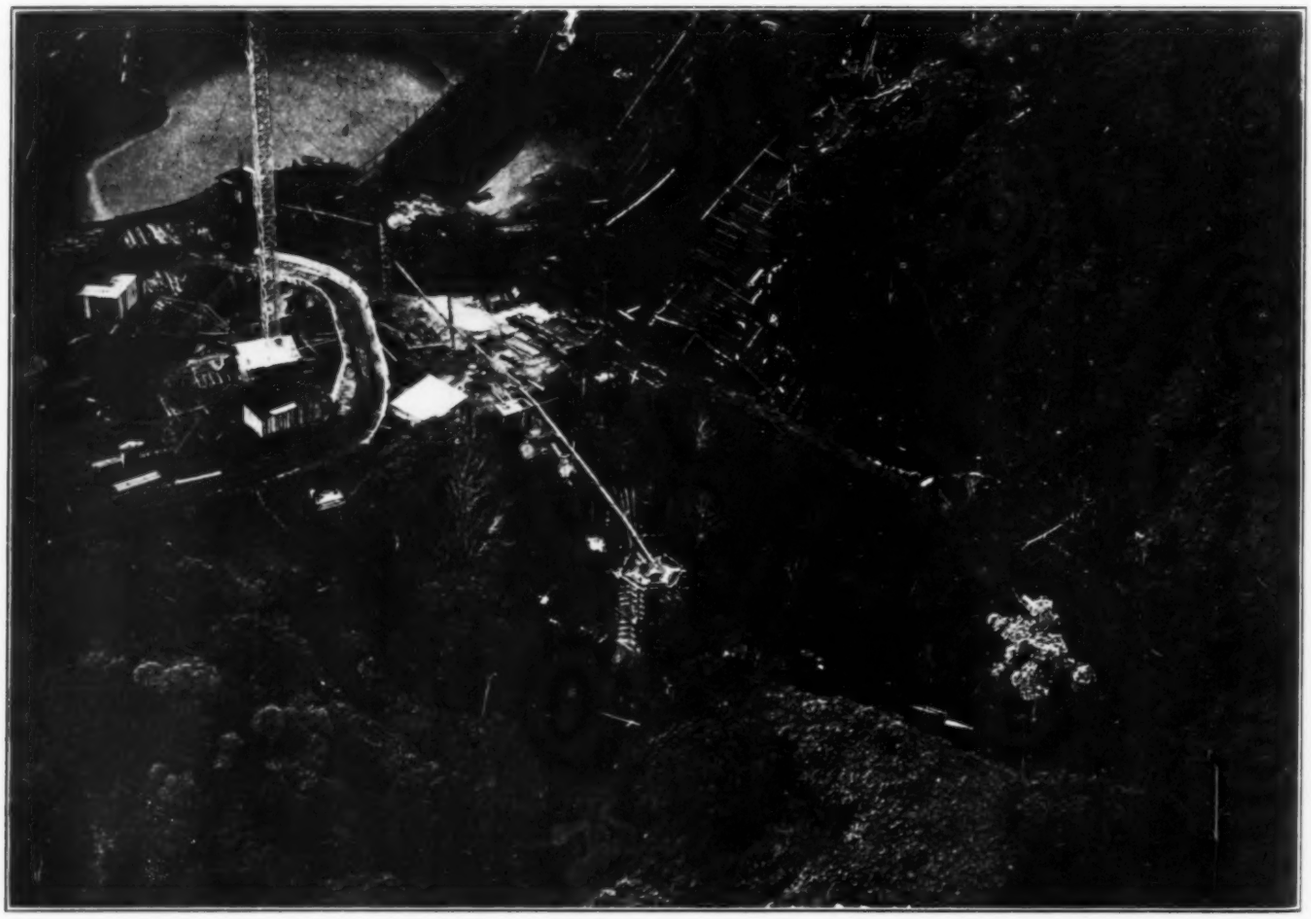
WITH the completion this winter of the new Ku Tree reservoir project for the military garrison at Schofield Barracks, the chief army post in Hawaii, the total available water in storage in the gravity supply will be increased from 45 to 335 million gallons. The site of the dam is in the Koolau range, across the north branch of the south fork of Kaukonahua River, about 5 miles east of the Post of Schofield Barracks. This stream has a normal flow throughout the year of about one million gallons per day and a flood discharge of over 400 million gallons per 24 hr.



BUILDING REDWOOD CORE WALL

The dam is an earth fill with a concrete cut-off wall and a redwood core, as shown in the cross section taken at stream bed. It will be when completed, 500 ft. long, 93 ft. high with a 30-ft. top width, and 3 to 1 slopes on both faces. Before the fill was placed, all vegetation on the site was burned away. The top soil, which was about 12 in. deep, was then removed. Most of this soil was on the steep side hill above the stream. To remove it from the site after loosening, it was hoed and washed into the stream during the time the stream was high.

The concrete cut-off wall extends about 30 ft.

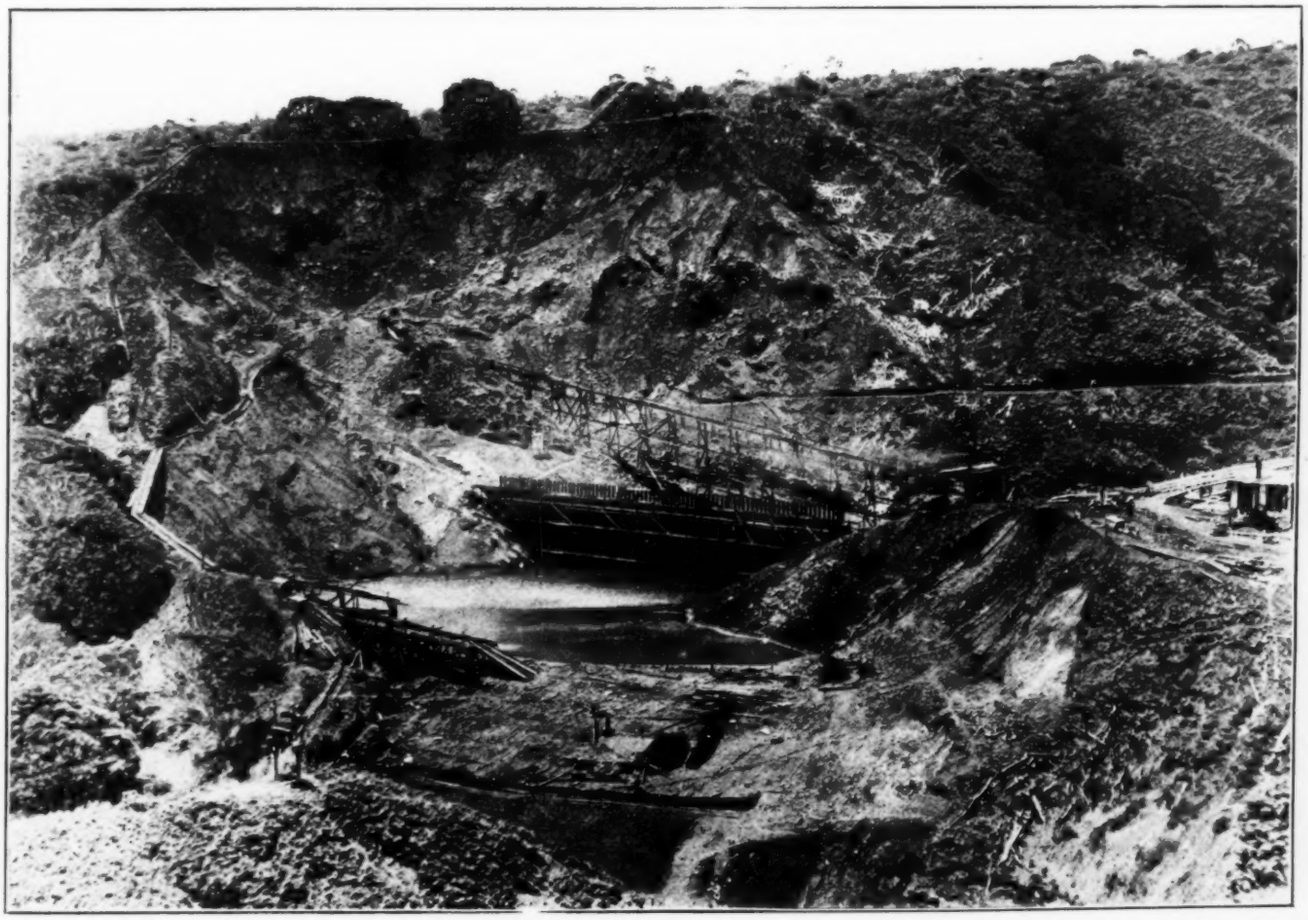


AIRPLANE VIEW OF WORK SHOWING VALVE CONTROL TOWER. THIS PHOTOGRAPH WAS TAKEN BY THE U. S. ARMY AIR SERVICE

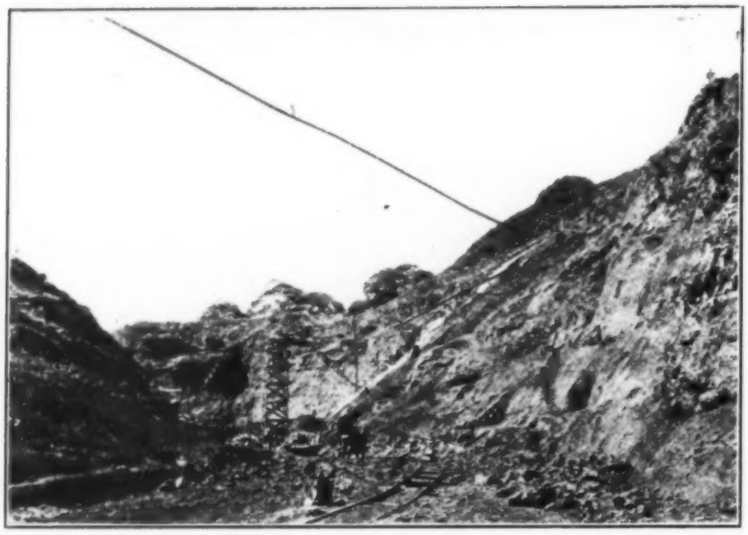
below stream bed and well into the banks on each side. In the top of this wall is a 12-in. groove in which is placed 3 plys of 4-in. redwood, forming a 12-in. core wall. The 1200 cu. yd. of concrete in this cut-off wall were distributed throughout the entire 500-ft. length of the dam. The top of the concrete varied with the contours of the ground and is always 18 to 24 in. above it. To pour this concrete economically, a 150-ft. tower was erected. From this tower a 1-in. cable was stretched to the top of the hill across the stream. On this cable were double blocks through which ½-in. rope was run. From this load-line, the height and slope of the chutes could be adjusted so as to bring the point of discharge where desired.

The concrete material was hauled by mules and dump wagons from the railway, three miles away. A trestle was erected at the end of the railroad spur on to which bottom-dump cars of rock were pulled by cable with a 10-ton tractor. At the concrete plant another wagon trestle was built and decked with 2 by 4's placed on edge 4 in. on centers. By thus reducing the handling of material, the 1200 yd. of concrete in the cut-off wall were placed for $18.00 a cu. yd., including material.

The redwood core consists of 3 plys of 4 by 12 clear redwood. The two outer layers are vertical with the center ply horizontal. The reason for the latter was to give same resistance to buckling in case of any possible un-



DOWNSTREAM FACE OF DAM 50 PER CENT COMPLETED. GRASS PLANTED BELOW FIRST BERM. THE UPPER PHOTOGRAPH SHOWS THE PORTAL OF THE DRAIN TUNNEL



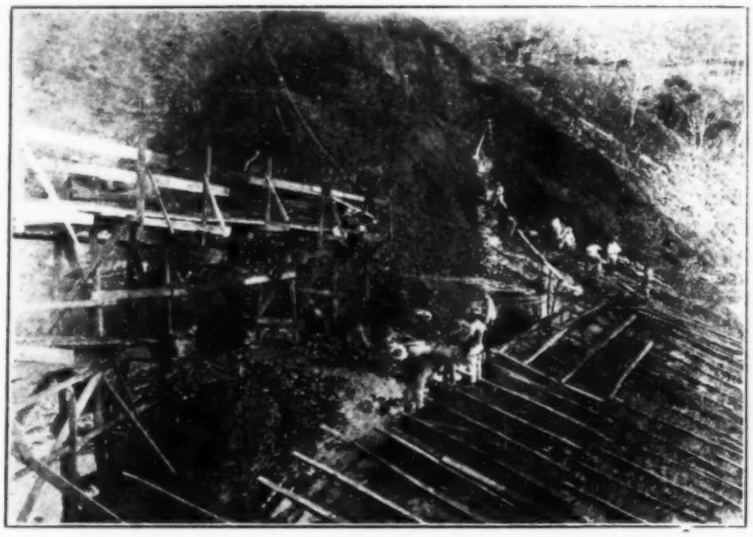
CHUTES IN PLACE FOR POURING CORE WALL

maintaining the required 3 to 1 slope for the face while the dirt was being placed. At first the face was stepped up by using embankments of old cement sacks filled with dirt. This method, however, proved too expensive. A quantity of old expanded metal which was available was placed to grade. The dirt was then sluiced under it. The mesh held the dirt allowing the water to run down the face. This is clearly shown in the two photographs. One hundred thousand yards of fill have been placed at a unit cost of 41 cents per yard, exclusive of the cost of the pumping plant.

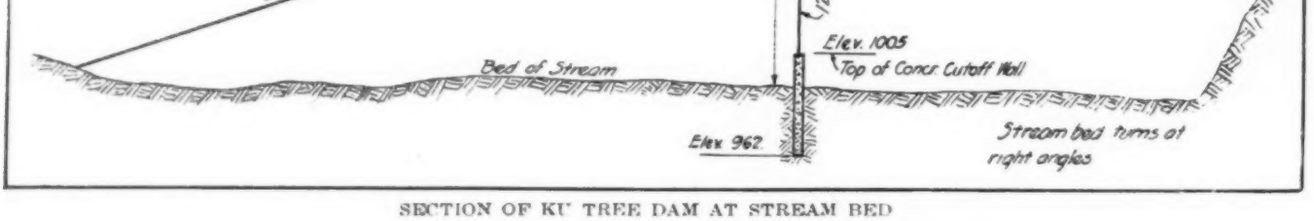
The run-off area of the Ku Tree reservoir is about 1 sq. mi., while that of the existing Koolau reservoir is over 10 sq. mi. In the rainy season the Koolau reservoir cannot impound the run-off of its area on account of its small size. To obtain additional water for the new reservoir and to save the waste at Koolau, an intake tunnel 3300 ft. long was driven connecting the Koolau supply ditch to Ku Tree, as shown in the sketch of the water systems. In driving this no rock was encountered except one nest of

equal settlement of the dirt on either side. An overhead trolley handled the 20-ft. sticks of redwood after they had been sized in the mill. The 160,000 board feet of timber required were obtained through local dealers from the Pacific Coast.

The 173,000 cu. yd. of fill in the dam are being placed by sluicing. A pumping plant with two 1000-gallon pumps was installed. The stream was diverted through the drain tunnel to the pumping plant where the water was pumped 230 ft. to the top of the hill above the north abutment. The dirt in the hill was first loosened by powder. The water coming through the soft dirt carried it, with slight hoeing and picking, into the flume from which it was placed where desired in the fill. The flume was a half section of 24-in. riveted steel pipe that recently had been removed from an old water line on the post and split with an acetylene torch. An average ratio between dirt and water of about 55 per cent was secured. In placing the dirt the elevations on downstream and upstream sections had to be carefully balanced to prevent deflections in the redwood core. Difficulty was experienced in

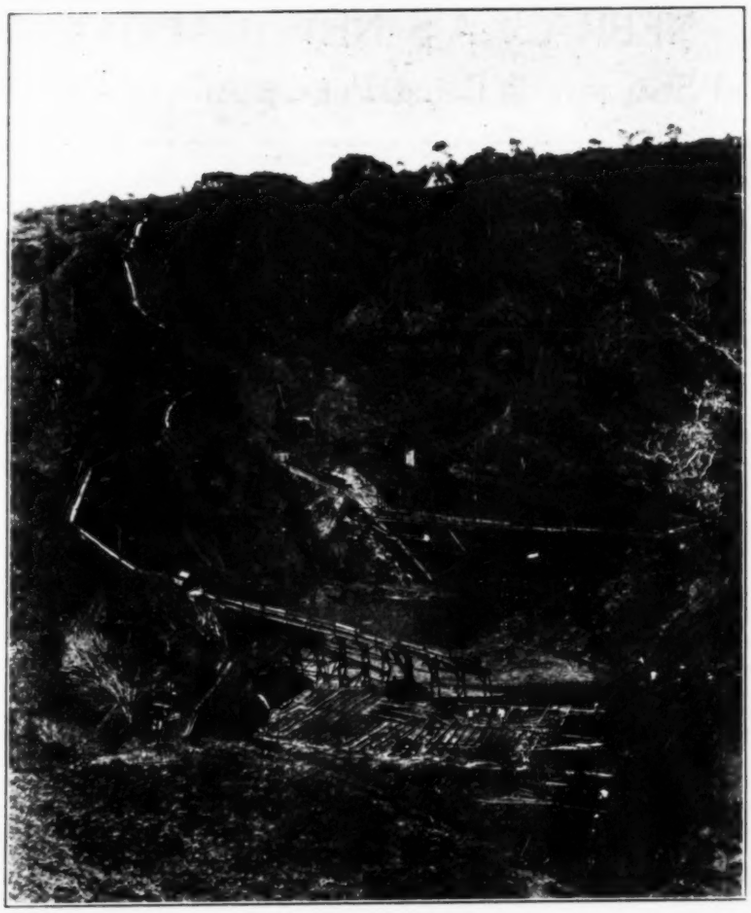


IN THE EARLY STAGES OF WORK ON DAM



SECTION OF KU TREE DAM AT STREAM BED

boulders that extended about 200 ft. It was unnecessary to shore the tunnel except in one place. The earth in the Hawaiian Islands stands on a perpendicular face and will support itself over a wide arch. This may be seen in the picture on page 5 showing concrete lining in the drain tunnel. Note the distinctness of the pick marks. The tunnel driving cost $8 per lin. ft. for 4 by 6 tunnel, in spite of the fact that water had to be contended with throughout. The dirt was removed in 1-yd. dump cars pushed by hand on 60 cm. track. The concrete ditch lining throughout this intake tunnel was placed with concrete furnished from a small mixer located nearly 150 ft. above each tunnel adit adjacent to the road over which hauling was possible. Chutes were used to a hopper set directly over the track at the tunnel entrance.



THIS PHOTOGRAPH SHOWS THE DAM AND THE STEEP HILLS WHICH SURROUND IT

The water from the new reservoir will be furnished to Schofield Barracks through a concrete valve control tower and a 20-in. cast iron pipe line laid in open tunnel that connects with the 24-in. line to the post that was recently put in with the needs of the new reservoir in mind. The reservoir can be emptied in 24 hr. through a 6-ft. by 6-ft. concrete drain tunnel, extending from the valve control tower through the ridge beyond the downstream face of the dam.

The spillway, which is located south of the dam, is 160 ft. wide at the mouth and 30 ft. wide at the point of discharge into the old stream bed. With 5 ft. of water flowing over the crest, a discharge of 5000 cu. ft. per second is possible. Due to the turnings of the stream the main thrust of the dam is against an existing ridge and the downstream toe of the dam instead of being parallel to the top is nearly at right angles to it.

ILLINOIS SETS NEW RECORDS IN HIGHWAY BUILDING

ILLINOIS is breaking all of its previous records this year in the building of hard-surfaced roads. The latest report issued by Frank T. Sheets, Chief Highway Engineer, shows that up to Aug. 21 706.14 miles of pavement had been completed this season. This mileage exceeds that of this time last year by 110 miles, which means that construction progress this year is about three weeks ahead of 1923.

The magnitude of construction operations being conducted by the Division of Highways is indicated by the fact that 118 paving mixers are operating on the roads throughout the State, and 10,500 men and 2900 teams are employed directly on road work. The best week thus far was that ending July 31, when 60.79 miles of pavement was laid. This exceeded last year's weekly record by 3.9 miles. The old mark was made in October so that it is more than likely that the new record will be in turn surpassed before the season ends.

The W. C. Meneely Company, working on Route 2, between Decatur and Pana, did the best day's work of the season when it laid 2671 ft. of concrete pavement in one day with one mixer. This same mixer in one week laid 10,405 ft. of pavement. Both of these performances established new records.

The progress made thus far is due to a large extent to the awarding of contracts in advance of the construction season. This policy was followed in Illinois this spring and the results are now beginning to show.

The citizens of Illinois will vote on a new $100,000,000 bond issue at the coming election. This bond issue provides for the completion of the original State highway system and the building of additional roads. Both principal and interest to be paid by motor license fees.

The work now going on is being done with the proceeds of the $60,000,000 bond issue which was voted several years ago, and the Division of Highways points out that unless the new proposal for the $100,000,000 bond issue goes through the work next year will be limited to less than 200 miles of pavement.

NEBRASKA'S NEW CAPITOL

Splendid Structure Is Being Put Up Around Old Building

ONE of the most interesting construction jobs now going on in the United States is the building of the new Capitol of Nebraska at Lincoln. The phrase "a monumental building" has been used so often that it has lost its true significance, but it happens to be the only phrase which adequately describes the new Nebraska Capitol. The architect, the late Bertram G. Goodhue of New York, designed the building with the idea of making it stand out as a monument which could be seen from miles around. Nebraska is part of the great central plain of the United States and a building of this character will therefore be visible for a much greater distance than it would in other sections of the country. It also has the value of breaking away from the conventional type of State Capitol and will possess an individuality which will make it one of the notable buildings of the nation for many years to come.

NORTH OF THE MAIN ENTRANCE OF NEW CAPITOL

As may be seen from the architect's drawing on the opposite page, the new Capitol consists of a main building with a central tower rising from a huge terraced base. The main part of the building, in which the work of the State offices will be carried on, will be 437 ft. square, including the terrace, and will have four open courts. The tower will be 400 ft. in height and 80 ft. square.

Work has now been going on for about two years and an interesting feature of the construction is that the new building is being put up around the old State Capitol, which will be retained as long as possible in order that there may be comparatively little interruption in the routine of the State's work. The lower photograph on this page shows the wall of the northwest corner of the new building with the dome of the old Capitol rising beyond it.

The new building is being constructed of Bedford stone, which is brought to the site by a steam railroad. A separate contract was let for the foundations, which were completed some time ago, and at present work is being done by the J. H. Wiese Co. A third contract will be let for the tower. Part of the new building already is occupied by State offices and under

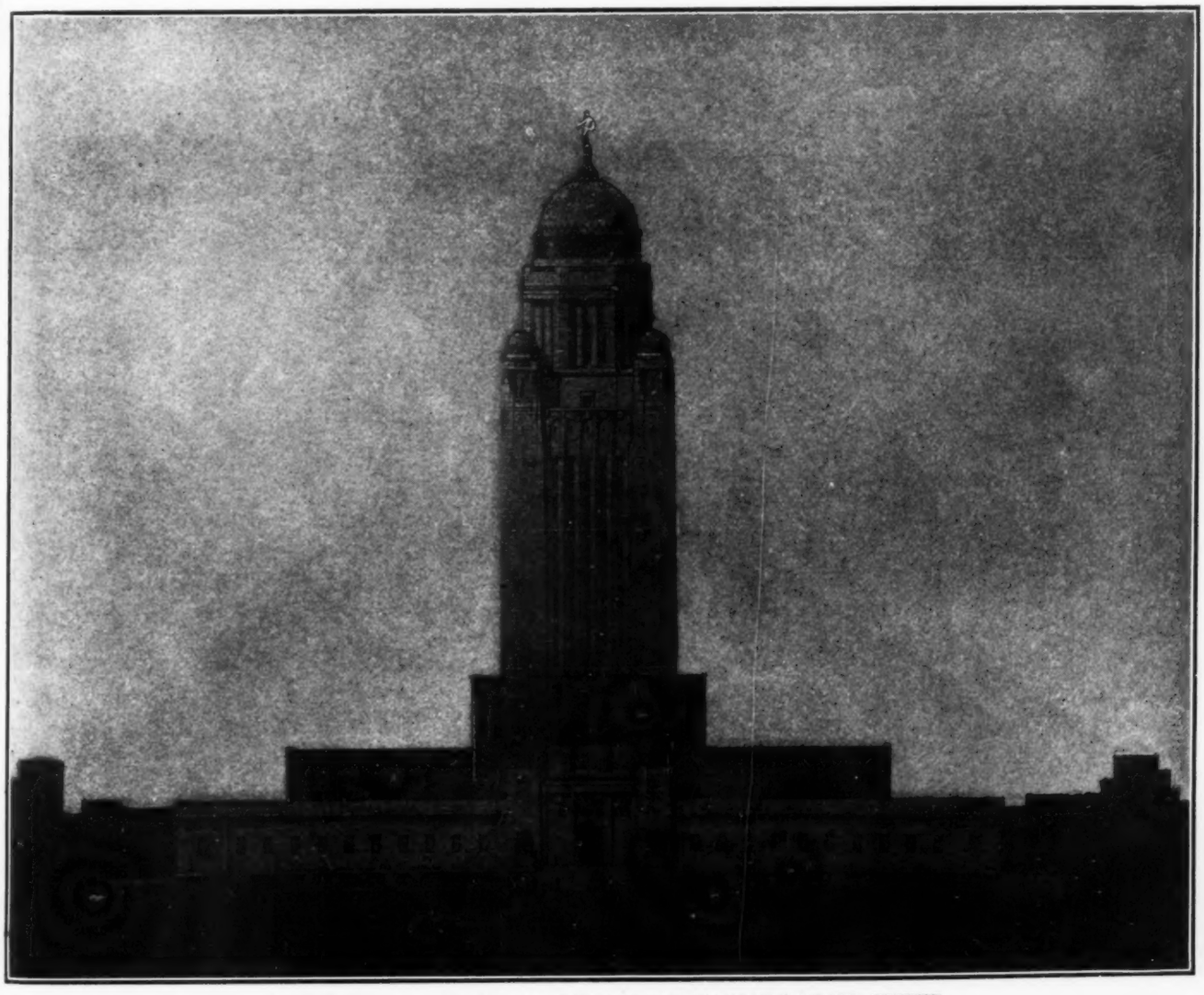
WALL OF NEW CAPITOL WITH DOME OF OLD BUILDING IN BACKGROUND

the plan of construction more of the State departments will move in whenever space is available for them. The cost of the new building probably will be more than $5,000,000, although that sum is all that has been appropriated thus far. The foundations cost practically $1,000,000. The first Capitol of the State, put up in 1867 on the same site, cost $75,000, so that either prices or Nebraska, or possibly both, have undergone considerable changes in the years which have elapsed.

The construction of the new Capitol is being carried on by a commission headed by Gov. Charles W. Bryan, the present Democratic nominee for Vice-President, although the plans were made and the work initiated by Governor Bryan's Republican predecessors.

ANOTHER VIEW OF THE NORTH DOOR, SHOWING ITS MONUMENTAL CHARACTER. THE DOME OF THE OLD CAPITOL APPEARS AGAIN

The contract for building the foundations was handled by the W. J. Assenmacher Company of Lincoln. The first section of the superstructure is being built by the J. H. Wiese Company, General Contractors of Omaha. The contract for the other sections of the superstructure have not yet been let. The stone used in building the Capitol comes from the quarries of the Henry Struble Cut Stone Company of Bedford, Ind., as Nebraska has to import its stone.



ARCHITECT'S DRAWING OF NEW CAPITOL WITH ITS 400 FT. TOWER

BUILDING MOUNTAIN ROADS IN WEST VIRGINIA

Plenty of Heavy Work Confronts Contractor in That State

THE rugged nature of the country makes highway building in West Virginia much more difficult than it is in many other States. The photographs on this page show the work on a State project in Summers

HAIRPIN TURN ON NEW ROAD

County, near Hinton, constructed by the Elkins Construction Company of Elkins, W. Va.

This project runs through the valley of the New River and then along Beach Run in a narrow ravine to the top of a mountain. The two upper photographs show the kind of excavation that had to be done last winter with power shovel. In all there were about 40,000 cu. yd. of rock to be excavated and a large amount of clay.

The small photograph at the left shows a hairpin turn after the base course of native stone had been laid. This base course is 18 in. thick and is superelevated on the curves to a depth of 20 in. The large photograph at the bottom shows a motor truck engaged in asphalt penetration work on this project. This truck is owned by Sam E. Finley. Limestone used on

HEAVY EXCAVATION WAS NECESSARY

the road came from the quarries of the Acme Limestone Co. D. W. Mawhinney was the superintendent in charge of this project for the Elkins Construction Company.

DISTRIBUTING THE ASPHALT

A Pair of Portable Cranes

The upper photograph shows a light crane mounted on a motor truck at work on an excavating job, while the lower photograph shows the new crane ship Kearsage of the United States Navy with its gigantic crane capable of lifting 250 tons. *© Keystone*

ARCH BRIDGE SOLVES ROAD PROBLEMS

Takes Colorado Highway Out of Canon and Eliminates Bad Curves and Hard Grades

By H. T. Reno
Resident Engineer, Colorado State Highway Department

THE Colorado Highway Department has recently dedicated a highway bridge, which on account of its unusual design and picturesque setting, has attracted much attention. Situated at Sapinero at the junction of the Gunnison River and the Lake Fork on the Rainbow Route, the new bridge eliminates one of the worst stretches of road in Colorado. This site is at the entrance of the Black Canon, parts of which are inaccessible and which is considered one of the roughest gorges in this mountainous state.

The original road followed this canon for a mile and then climbed out to the mesa above with a hill which was the terror of the motorist. While the grade averaged only 8 per cent there were several curves with 15-ft. radii and short stretches of 20 per cent grade. In the canon parts of the road were under high water and there was one nasty grade crossing.

Numerous surveys were made in an endeavor to obtain a 6 per cent grade and it was finally decided to stay out of the canon altogether and bridge the Lake Fork immediately above the mouth. The site selected proved ideal for an arch bridge with two short approach spans. All bearings are in solid rock without excavation. The depth of the canon allowed plenty of room for the arch and the rock, a hard gneiss, is absolutely undecomposed.

Construction was started in June, 1923. A compressor run by a small tractor was installed and the necessary preliminary blasting done with pneumatic drills and 40 per cent dynamite. The cliff on the east side was found to overhang so that it was necessary to remove about 2 ft. from the face for a depth of 40 ft. This work had to be done very cautiously, not only on account of the danger of falling but on account of the railroad bridge below.

The rock proved very brittle and showed a tendency to break to the next seam. If an excess of powder was used the flying rocks endangered the railroad bridge. The procedure finally adopted was to drill holes 2 ft. deep and use a half a stick of powder. If this did not break, the hole was cleared out and redrilled and the charge increased with a full stick as the maximum charge without special permission. In cutting out niches for the pedestals, some of the rock

GENERAL VIEW OF NEW BRIDGE SHOWING RAILROAD BRIDGE IN FOREGROUND AND OLD HIGHWAY BRIDGE FURTHER BACK

CONSTRUCTION OF STEEL WORK WAS CARRIED ON THROUGH THE WINTER

was wedged out to avoid breaking to lower seams. The workers did all this while hanging on the end of a rope. Concrete work was finished in October but steel was not received until December.

In order to have the bridge ready for this summer's travel, it was finally decided to erect the steel at once and let it stand until spring before placing the concrete floor. The altitude is 7250 ft. and the snow is so deep that ordinarily all traffic is suspended in December to be resumed the following May. Temperatures of 30 degrees to 40 degrees below zero are not uncommon during December, January and February, and more unfavorable conditions for a difficult erection job could not be imagined. Fortunately the winter proved to be very open with little snow, the lowest temperature being 25 below zero.

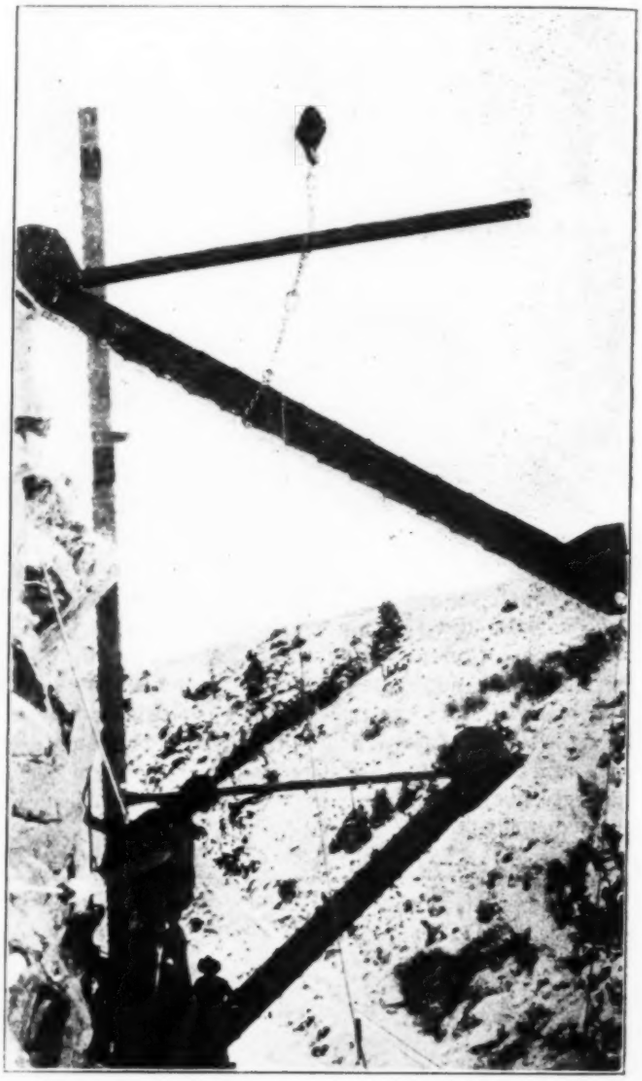
Holes for deadmen had been dug the summer before. These were buried and water poured in and allowed

ARCH UNDER CONSTRUCTION, SHOWING METHOD OF WORK

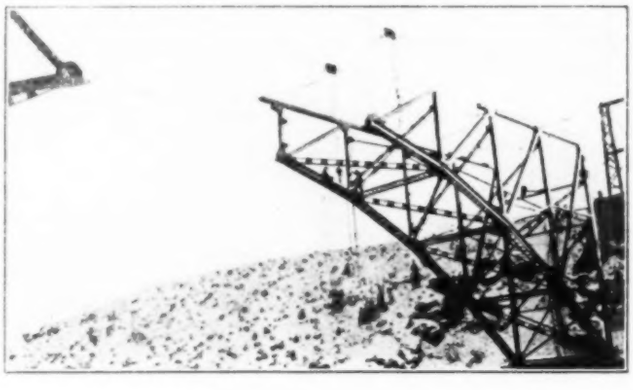
SETTING THE BASE SHOES

to freeze. Headframes were erected on either side of the bridge with two 1⅛-in. cables, one over each truss, and steel was run out by means of trolleys, using a double drum steam hoist. The cantilever method was adopted for erection. All steel was delivered to the east side and the massive base shoes grouted into place in a snow storm. These were of course protected by canvas and salamanders for several days. Lower chord members were then set and held by temporary cables until the end posts and braces could be lowered and bolted into place. These posts were then guyed back to eye bars through the abutment weep holes. Successive diagonals, lower chord members and posts were then placed until the second chord point was reached. The top chord member was then placed and the 1⅛-in. cables bent to these, run over the head frames and back to the dead men. The cables were provided with turnbuckles and the end posts given several inches batter away from the arch.

Work was carried on alternately from either end and all steel possible left out until after connection in order to lighten the load on the cables. A perfect connection was made inside of 30 days after starting work. The remainder of the steel was then placed and the 6-ton girders forming the west approach span taken across using both trolleys. Pouring the floor and the final coat of paint were deferred until May and the bridge opened for traffic in June.



SETTING A CHORD MEMBER ON EAST SIDE



The bridge is 249 ft. long with a 20-ft. clear roadway designed to carry two 20-ton trucks. The arch span is 180 ft. and the two approach spans 15 ft. and 54 ft. The maximum height to the bridge floor

is 135 ft. The old wagon bridge in the background shows the progress made in highway construction. The general contractors were Winterburn and Lumsden of Grand Junction, Col. The steel was fabricated and erected by the Minneapolis Steel & Machinery Co.

KEEPING MATERIALS ON THE MOVE

Hoist Does Double Duty on Building Job in Congested District of Busy City

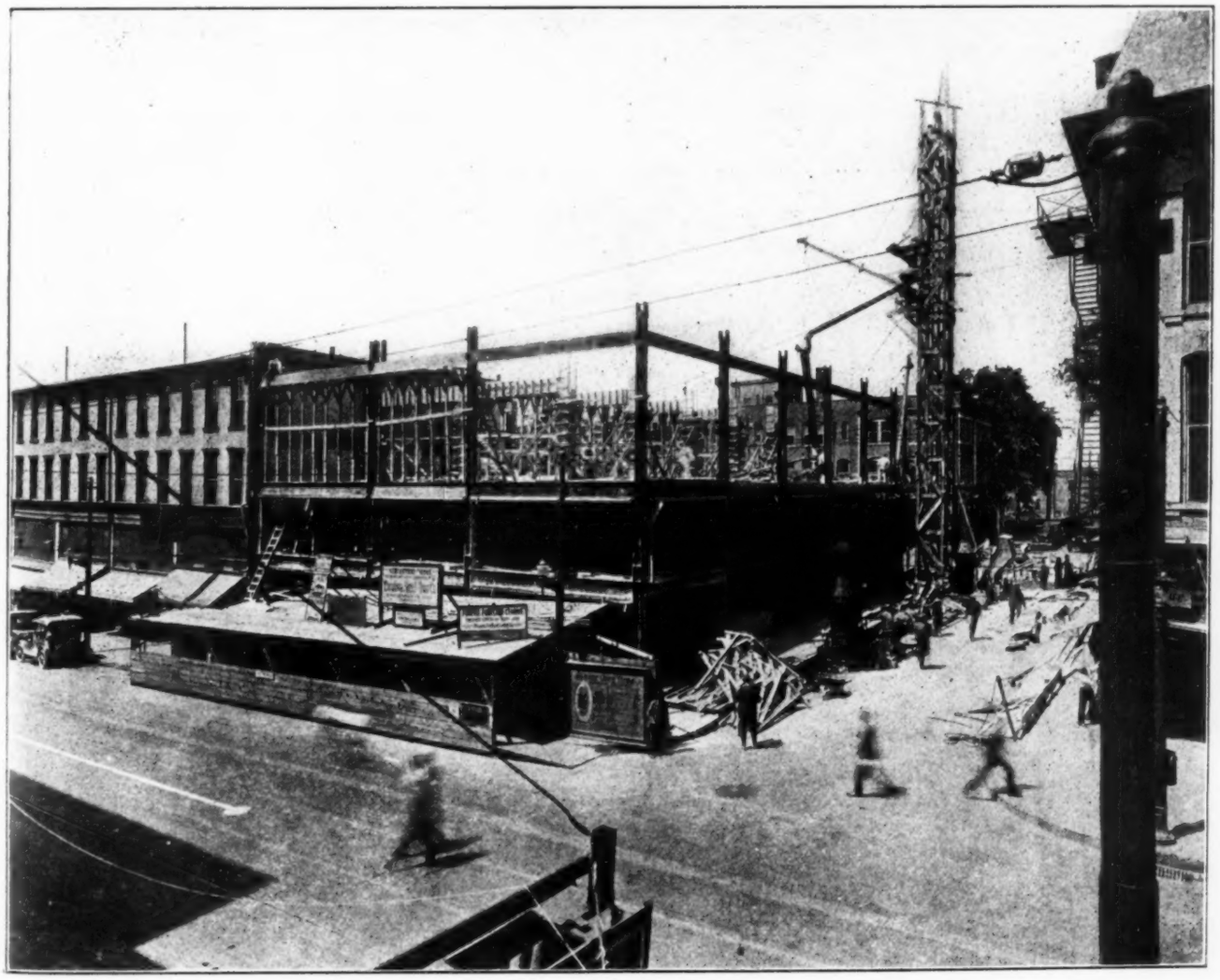
EVERY contractor faces the problem of taking care of his material on a building job in the business district of a city. Modern traffic conditions are so different from those of the past that it is no longer possible for the contractor to utilize a good share of the street adjoining the building he is putting up, and he now has to find some way to unload his materials and get them on to the actual building site in the shortest possible space of time.

This problem presented itself to Angle & Moesser, building contractors of Greensboro, N. C., who were putting up a new building for Meyer's department store on the corner of Main and Sycamore Streets, in that city. It was, of course, impossible to store any material on Main Street and as Sycamore Street is only 22 ft. in width, comparatively little space was available there. It therefore became necessary to hoist the material as fast as it arrived. A tower and chuting plant was erected on Sycamore Street and operated by a steam hoist, also set in the street close to the curb, so that the remainder of the narrow thoroughfare was left open.

As the building contained about 3000 cu. yd. of concrete work, this hoisting and chuting plant was kept busy right from the start. The pouring of concrete from the first floor to the roof required only 4½ days.

While the hoist was operating the chuting plant, the sheave was used to hoist the reinforcing and frame lumber so that the machine did double duty.

The arrangement of this plant is shown clearly in the photograph on this page. It is a good example of what can be done in close quarters by the effective utilization of machinery suited to the job.



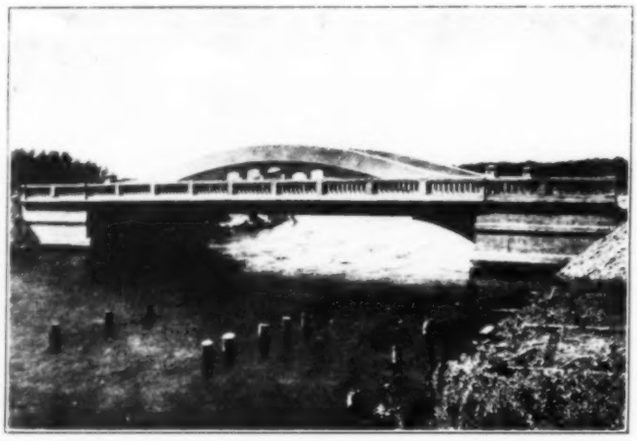
HOIST AND TOWER OCCUPY MINIMUM OF SPACE IN NARROW STREET

MICHIGAN IS BUILDING MODERN BRIDGES ON ITS HIGHWAY SYSTEM

Typical Concrete Structure Spans White River Between Whitehall and Montague

MICHIGAN is replacing its old highway bridges with modern structures as fast as possible. A typical example of the new bridges which the State is building crosses the White River between the villages of Whitehall and Montague. It was designed by C. A. Mellick, State Highway Engineer of Michigan, and built by Robert Love & Son of Muskegon.

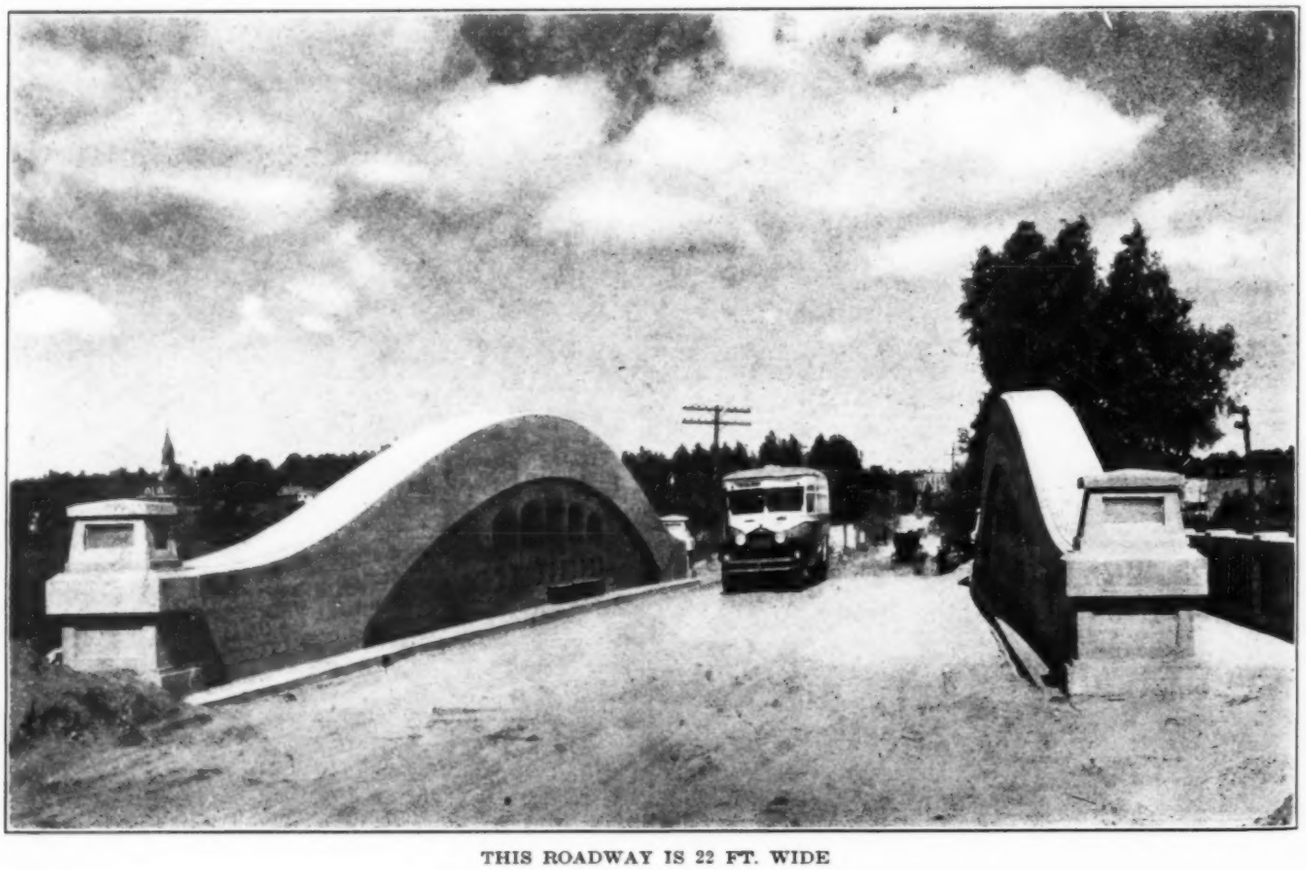
This bridge is built of concrete and carries a roadway 22 ft. in width and one sidewalk 5 ft. wide. The bridge rests on a foundation of 40-ft. piles, 162 of them being driven. Two concrete girders support the structure, which rests on concrete abutments. These abutments contain 337 cu. yd. of concrete and 5440 lb. of reinforced steel. The girders with the roadway and sidewalk contain 350 cu. yd. of concrete and 97,130 lb. of reinforcement.



NEW CONCRETE BRIDGE

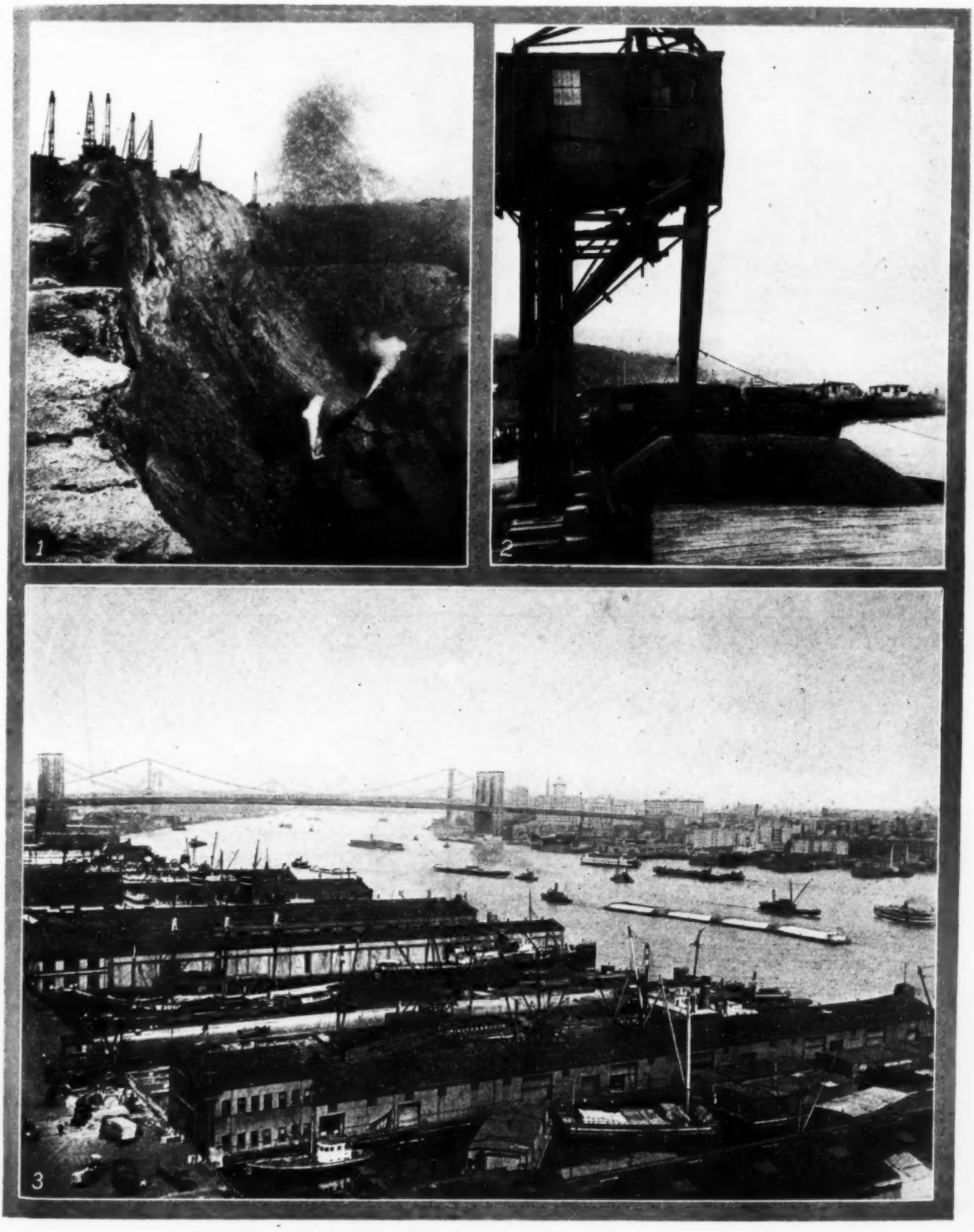
The contract for the construction of the new bridge included the building of a temporary bridge and the dismantling of the old highway bridge, which was on the site of the new one.

The photographs show the new bridge from two different points of view. The small photograph gives a good idea of the general appearance of the structure and the large photograph at the bottom of the page clearly demonstrates its capacity to handle the considerable volume of traffic. The 22-ft. roadway and the 5-ft. sidewalk at the right will take care of the travel between Whitehall and Montague for many years to come.



THIS ROADWAY IS 22 FT. WIDE

Stone for New York's Construction Work

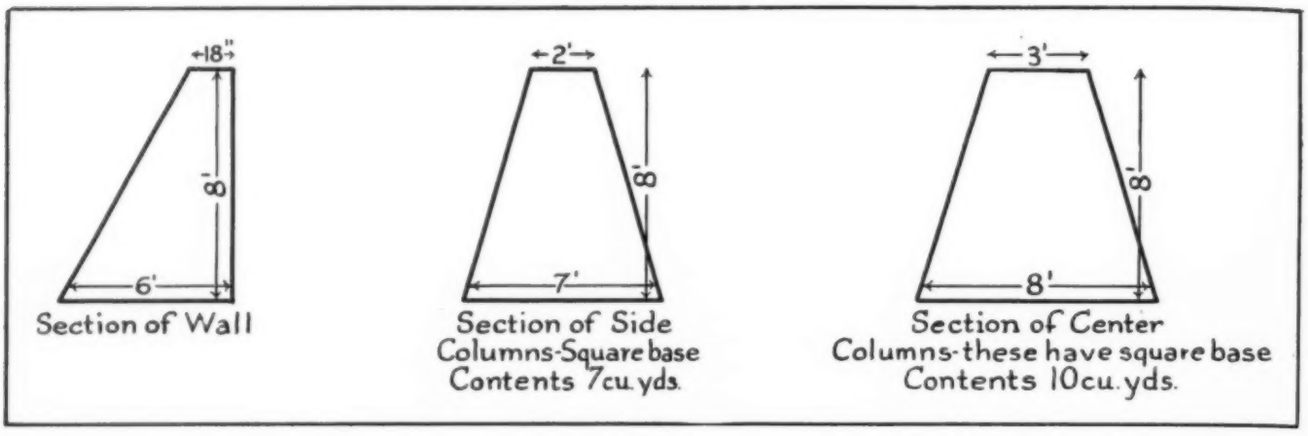


1. Getting out the stone at Tompkins Cove. © *Keystone*
2. Loading the barges. © *Keystone*
3. Four barges being towed to the pier in New York. © *Ewing Galloway*

BUCKET LOADER HANDLES WET CONCRETE

Machine Performs Unusual Task on Big Pier Job in Baltimore Harbor

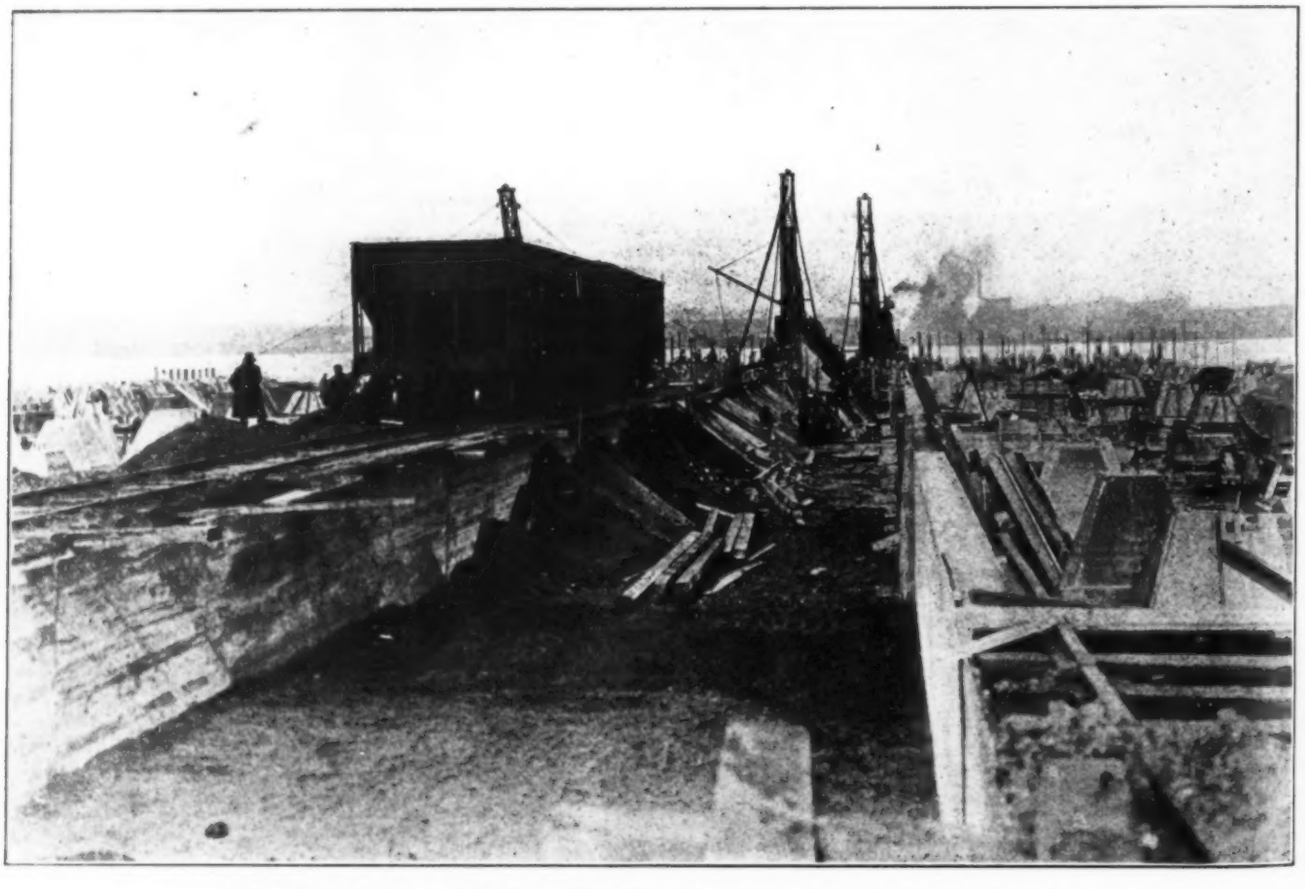
BY W. B. MCCAULEY



INGENUITY is one of the attributes of the successful contractor, and a job recently finished at Baltimore, Md., offers proof of that fact. The Empire Engineering Company was engaged on the construction of the foundations for a new pier for the Baltimore & Ohio Railroad. This pier, the largest in the harbor, is 1000 ft. long and 185 ft. wide.

One of the problems in connection with the work was the construction of concrete columns 8 ft. in height, spaced 20 ft. apart. These columns, with the walls which support the freight house, were erected on a foundation made by sinking wooden piles to a depth of 65 ft., which were planked over with creosote joists and then with planks set crosswise.

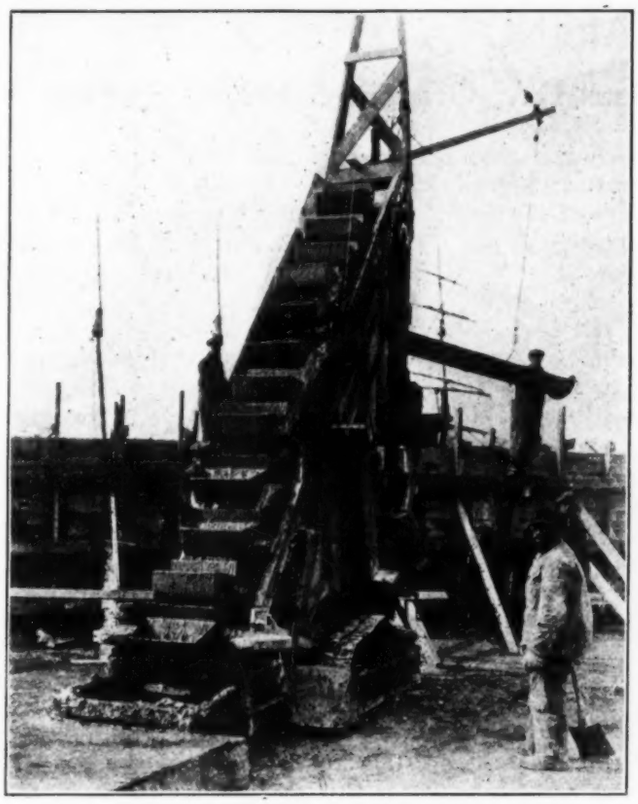
The mixer, of 1-yd. capacity, equipped with a crane, was mounted on a barge, and the sand, gravel and cement were brought in on other barges and fed to the mixer. The mixer then discharged into a hopper



A GENERAL VIEW OF THE PIER SHOWING THE BUCKET LOADER IN THE CENTER

on the wooden foundation of the pier.

At this point the problem of raising the wet concrete to a height sufficient for pouring the 8-ft. columns, and at the same time doing this work with an easily movable unit, presented itself. It was finally solved by utilizing a bucket loader in a way decidedly unusual for this type of machine. The revolving discs of the loader were removed and replaced with a hopper into which the wet concrete was poured. A small chute, supported by an A-frame and boom attached to the loader, was used to pour the concrete when it had been elevated by the loader. As the loader was mounted on crawler treads, it could be moved from one column to another without appreciable delay, and it was this feature which made it especially valuable.



HANDLING THE WET CONCRETE

That the machine performed its work in satisfactory fashion can be seen from the fact that it poured 8965 cu. yd. of concrete in 80 working days without a single breakdown during the entire period. The job was finished well ahead of schedule. It required only about 15 min. to pour the larger columns shown in the right of the diagram on page 18, and the small columns were finished in about 12 min. The general superintendent of the Empire Construction Company is H. F. Howden and the superintendent in actual charge of the job was J. G. Lindsey.

The photograph on the cover of this issue of SUCCESSFUL METHODS shows the bucket loader at work on this job. The way in which it was rigged for its unusual work is shown clearly.

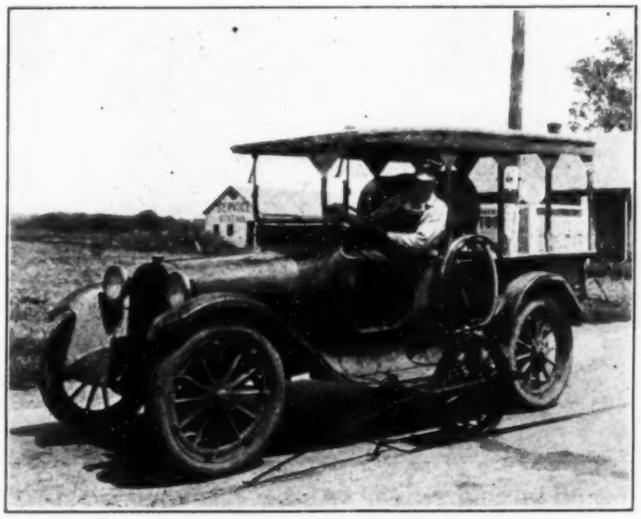
A Simple Pavement Marker

THE marking of highways is a job which must be carefully done and which consumes a great deal of time. A. C. Lagerwall, county engineer of Shawnee County, Kan., has solved his marking problem by devising a machine which he attaches to the running-board of his light maintenance truck.

This machine consists of a wheel mounted in a guide which permits it to be raised and lowered. The paint is carried in a barrel in the truck and fed to the wheel by a hose connection. A strip of felt ½ in. thick and 3½ in. wide around the perimeter of the wheel does the actual marking.

A guide about 5 ft. long is attached to the end of the frame in which the wheel is set. This enables the driver of the car to keep the marking wheel in the correct position.

Mr. Lagerwall has succeeded in marking about 15 miles of road per day with this machine at an average cost of 50 cents per mile, not counting the cost of the paint, of which about 3 gal. per mile are used. The driver now operating the machine in Shawnee County averages about 2 miles per hour. He requires no helper, but simply fills up his barrel with paint when he starts out in the morning and keeps on until the supply is exhausted. The machine is attached to the running board by two simple clamps. It therefore can be carried to the job in the body of the truck and attached upon arrival with the loss of only a minute or two. When moving a short distance it is possible to raise the wheel to a height of 6 in. above the pavement and if desired it may be kept in this position on even longer runs from one job to another.



The machine also can be used in the maintenance and refilling of longitudinal joints in concrete roads.

RAISING A WRECKED BRIDGE

Steel Span at Coos Bay, Oregon, Salvaged by Use of Hydraulic Jacks

AN awkward and difficult job was successfully completed recently at Coos Bay, Oregon, by Booth & Pomeroy, bridge contractors of Portland.

Last spring a big wooden vessel ran into the bridge of the Southern Pacific railroad at Coos Bay and pushed a steel span 180 ft. in length off its piers. This span had turned over as it fell from the piers and the greater part of it was submerged as the water at that point is 36 ft. deep. The railroad company received bids for the work of raising the span and putting it on shore, Booth & Pomeroy submitting an estimate considerably under that of all of their competitors.

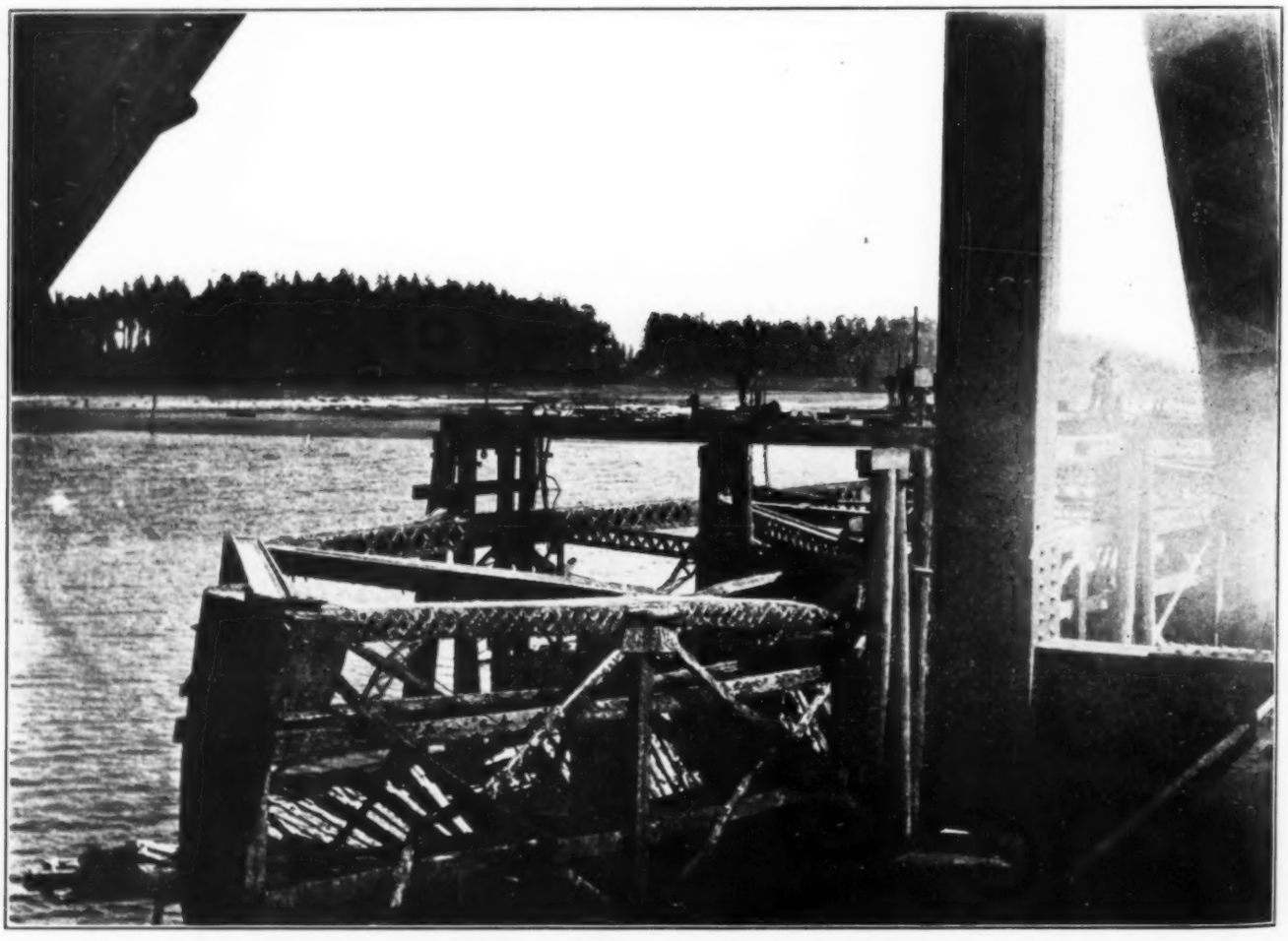
The plan adopted was to drive piles around the wrecked span, to attach 1-in. steel cables to various points along the top and bottom chords of the wrecked span. Hydraulic jacks were then used to raise the structure, two 35-ton jacks lifting each cable. In all twenty-eight of these jacks were used, each jack operating on a bolt 12 ft. in length.

The work was done in such a manner that as each section of the span was jacked up it was possible to hold it in place while the jack was adjusted for the next step without losing any of the height gained. The entire job required about four weeks' time and some of this time was lost because of bad weather conditions. The actual raising of the span after all the piles had been driven required only 8 days of work.

When the span had been raised high enough three barges were floated under it, the span lowered and then towed ashore. Inspection of the wrecked section of the bridge showed that about two-thirds of the steel work in the bridge could be used again. The section where most of the damage had been done was along the bottom chord on one side and this will be entirely renewed.

The job was handled economically as the driving of the wooden piling cost only about $600 and only 16 men were employed on the work of driving the piling and later of raising the span.

Naturally most of the damage occurred at the point where the bow of the steamer came in contact with the bridge. In addition to the big chord, one of the laterals was crushed. In reconstructing the span an entirely new system of laterals is planned because of



THE BIG SPAN AS IT EMERGED FROM THE BOTTOM OF THE BAY. THE PILES AND JACKS USED IN RAISING IT MAY BE SEEN IN THE PHOTOGRAPH

the fact that these lighter members were twisted badly in the falling of the bridge. The entire structure was covered with marine growths of various kinds which had to be removed by steam jets and sand blasting. In some cases hand chiseling was necessary.

When the work of reconstructing the span is completed it will be replaced on its old abutments. The temporary bridge constructed to carry the railroad after the accident will be used in the replacement work.

Road Show at Chicago Will Have More Space for Exhibits

THE 1925 Road Show and Convention of the American Road Builders' Association will be held in Chicago Jan. 5 to 9, inclusive. Charles M. Upham, Business Director of the Association, announces that much better arrangements have been made for both the show and convention than in any previous years. The preliminary plans also are already as far along as has been usual at a much later date. Every indication, therefore, is that these two big annual events in the road building industry will in every way eclipse all past records.

The program committee which will have charge of the convention will be headed by Prof. T. R. Agg. He expects to have the organization of his committee completed soon. Professor Agg has had such a variety of experience in the highway field that he will be able to produce a well-balanced program of general interest. The convention sessions will be held at the Congress Hotel.

Nearly 17,000 sq. ft. of additional floor space suitable for heavy exhibits will be provided at the Coliseum. This additional space is being obtained by the extension of the Coliseum to the north. The present main building and the adjoining building which have been used in the past also will be available. There will thus be room for more and better exhibits than in the past.

Additional doors for bringing in the heavy exhibits also have been arranged. Plenty of time to get the exhibits into the buildings further will be allowed by the schedules made possible by the dates of the show. These improved arrangements coupled with the wonderful success of the last two road shows insure the largest and best industrial machinery exposition ever seen in this country.

Application blanks for space in the Road Show will be mailed shortly by Mr. Upham to all concerns whose names are available. Additional blanks may be obtained by addressing him at 37 West Thirty-ninth Street, New York City.

Committees are being formed to handle the annual banquet, hotel arrangements, registration and various other features. The plans for these features, as well as for the show and convention, will all be arranged long in advance of what has been customary in previous years. With greater interest in highway building than ever before, the attendance from all parts of the country thus is certain to break the remarkable records of the last show and convention.

Applications for exhibition space at the Road Show will close Oct. 15. They should be sent to Mr. Upham. Exhibitors at the show must be members of the Highway Industries Exhibitors' Association and manufacturers desiring to joint that Association should write to the treasurer, C. R. Ege, 1200 Wrigley Building, Chicago, Ill.

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No. 33 "Leyner" Drill Steel Sharpener

One man with no helper sharpens 60 to 80 bits per hour on this machine. In less than two hours' time he redresses all steels needed on the job, leaving him free for other work. Other advantages are perfect bits, exact gauge variation, faster drilling and less steel breakage.

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"These Compressor outfits will reduce costs on rock work all over. Were I again to start in the contracting business knowing what I now do, the first equipment I would buy would be an Ingersoll-Rand Portable Gasoline-Engine Driven Compressor outfit with drills, and certainly a sharpener."

An unsolicited letter from a contractor who took this means to express his satisfaction with I-R equipment and service.

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